REMARKS

Reconsideration of this application, as amended is requested.

Claims 1-3, 5, 6 and 8-18 remain in the application. Claims 4 and 7 were canceled previously. No claims have been amended. However, new dependent claims 15-18 have been added.

The undersigned attorney for the applicants thanks Examiner Lee for the courtesies extended during the personal interview on November 1, 2005.

The interview was attended by the undersigned attorney of record and Christian Haydn. Mr. Haydn is a German citizen employed by the firm of European patent attorneys that wrote the European application upon which priority is claimed. The Examiner undoubtedly will agree that Mr. Haydn was very well versed in this technology and very familiar with the subject matter of this application and the references that were relied upon in the office action.

During the course of the interview, counsel and Mr. Haydn explained that all of the claims in the subject application relate to converter devices disposed in a cascaded array. Each converter device in the cascaded array has an insulator with opposite first and second surfaces. A first conductive layer is disposed on the first surface of the insulator layer and a second conductive layer is disposed on the second surface of the insulator layer. Each converter device in the cascade of the claimed detector also has at least one converter layer arranged on at least one of the first conductive layer and the second conductive layer to define an outer most part of the respective converter device.

The claims were rejected under 35 USC 103(a) as being obvious over Danielsson et al., U.S. Patent No. 6,429,578 considered in view of Sauli, U.S. Patent No.

6,011,265. These references were discussed in great detail during the interview. The most recent office action described features of Danielsson et al. that were considered by the Examiner to correspond to the detector set forth in the previously amended claims. The office action included reference numerals that defined the respective parts of Danielsson et al. that were considered most relevant by the Examiner. Most of the reference numerals employed in the office action referred specifically to the second embodiment in FIG. 7a of Danielsson et al. In this regard, the Examiner acknowledged that this second embodiment of Danielsson et al., as shown in FIGS. 7a and 7b lacks explicit description that at least one converter layer is arranged on at least one of the first and second conductive layers of the Danielsson et al. detector. However, to overcome this admitted deficiency of Danielsson et al., the Examiner turned to the Sauli reference. Here the Examiner stated that Sauli teaches a GEM structure with an integrated converter layer arranged on at least one of the first and second conductive layers. Accordingly, the Examiner concluded that a person skilled in this art would consider it obvious to combine Sauli with Danielsson et al. and that the hypothetical combination would suggest the detector of the subject application.

Counsel noted that earlier arguments submitted in this prosecution asserted that the Danielsson et al. reference relates primarily to a high energy detector. The Examiner had previously corrected the applicants in this regard and noted that col. 1, lines 11-17 explain that the Danielsson et al. detector "relates to a detector system with high efficiency over a wide range of photon and electron energies from diagnostic X-rays starting from the low energies of a few keV all the way up to 100 MeV, i.e., energies that are of interest and used in radiation therapy or for imaging of large and/or dense objects."

The Examiner's statement regarding the Danielsson et al. disclosure clearly is correct. The applicants' statements that Danielsson et al. is primarily a high energy detector clearly were based on an incorrect reading of Danielsson et al. and are hereby withdrawn. However, the Examiner's accurate interpretation of Danielsson et al. leads to a more significant question. Specifically, since Danielsson et al. appears to disclose a detector that is useable over a very broad range of energies, why would the skilled artisan be motivated to redesign Danielsson et al?

As discussed during the interview, the Danielsson et al. reference discloses two optional arrangements for a detector. The first arrangement is illustrated most clearly in FIG. 3 of Danielsson et al. This arrangement has an alternating array of GEM structures and metallic converters. Each GEM structure has an insulator with conductive layers on opposite sides of the insulator. However, this FIG. 3 embodiment of Danielsson et al. clearly shows and requires the GEM structures 304 to be spaced from the metallic converters 302. This spacing is necessary because the FIG. 3 embodiment of Danielsson et al. requires a different potential to exist between the metallic layer of each GEM structure 304 and the adjacent metallic converter 302. The different potential could not be maintained if the converter layer was arranged on one of the conductive layers of the GEM structure 304.

The second embodiment of Danielsson et al. discloses a composite layered structure as an alternate to the FIG. 3 arrangement where the metallic converters 302 are spaced from the GEM structures 304. In this regard, the second embodiment of Danielsson et al. has a thick metal converter layer 708 disposed internally in the composite

layered structure. Accordingly, the second embodiment of Danielsson et al. shows the following arrangement:

Conductor
Insulator
Metalic Converter
Insulator
Conductor

The office action acknowledged the structural differences between the second embodiment of Danielsson et al. and the claimed invention. Accordingly, the Examiner turned to Sauli in an effort to overcome those structural differences. However, Danielsson et al. teaches not to use a Sauli-like GEM, and points out that the composite layered structure shown in FIGS. 7a and 7b has advantages over such a GEM. Danielsson et al. explicitly refers to a GEM (FIG. 2 of Danielsson et al.) having a structure very similar to the GEM of Sauli (col. 11, lines 27-32).

Sauli, on the other hand, clearly teaches away from the type of combination and reconstruction that would be required to support the rejection. In this regard, FIG. 10 of Sauli discloses a GEM structure with an internally disposed insulator, metal layers on opposite respective surfaces of the insulator and a photocathode layer on one of the metal layers of the GEM structure. Sauli teaches that additional layers of the detector can be provided for enhanced amplification (col. 23, lines 18-22). However, any such additional layer in the Sauli detector for enhanced amplification necessarily would be a GEM structure without the photocathode layer provided on the outer most or top layer of the array. In particular, Sauli teaches that a further "electron gas multiplier" could be used to embody a multistage radiation detector for photons (col. 23, lines 18 and 19). In this respect, Sauli does not address any further converter layers arranged at the further GEMs.

Rather, Sauli has specific implications that such further converter layers are not applicable. For example, Sauli asserts that besides trying to avoid possible damage by positive ions, "secondary photons produced during the electron avalanche process... cannot heat the photocathode layer" (col. 23, lines 25-30). The electron avalanche occurs spatially after the converter layer, thereby implying that there cannot be provided any further photocathode layers in addition to the one and only converter layer arranged on the top most GEM. Furthermore, Sauli, teaches an optical transparency of the GEM that is close to 1. Therefore, any further converter layer after the first GEM would be useless.

It was asserted during the interview that a skilled artisan would not be motivated to combine Danielsson et al. and Sauli. However, any such hypothetical combination of these references certainly would not provide a plurality of detector devices with outer converter layers on each detector device in the cascade because Sauli clearly teaches away from such a cascade.

Even if the skilled artisan decided to attempt a Danielsson et al./Sauli combination, this hypothetical combination would not lead to the invention defined by any of the claims as previously amended. The skilled person familiar with the teaching of Danielsson et al. and Sauli would be aware that the heating of the photocathode by secondary photons is important for providing an efficient detector. According to Sauli, heating of the photocathode is avoided by providing only a single photocathode. This teaching of Sauli would apply to a plurality of photocathode layers (i.e., a plurality of converter layers) that would be arranged to avoid heating the converter layers. According to Danielsson et. al., on the other hand, it would be obvious for a person of ordinary skill to protect the photocathode from such secondary photons (which generally are less energetic

than primary photons) by covering the photocathode (i.e., the converter layer). Hence, the skilled artisan who is familiar with both Danielsson et. al. and Sauli would appreciate that the problems of Sauli are overcome by the detector device of Danielsson et. al.. Knowing Danielsson et al. and Sauli, the skilled artisan would realize the advantages of Danielsson et. al. over Sauli (as pointed out in Danielsson et. al.), and therefore would merely provide the detector of Danielsson et. al. rather than the hypothetical reconstruction and combination of Sauli and Danielsson et al. Furthermore, the hypothetical Danielsson et al./Sauli combination as relied upon in the office action merely would move the internally disposed metal converter of Danielsson et al. to the external position shown by the uppermost detector layer in Sauli. However, this hypothetical reconstruction would place the thick metal converter of Danielsson et al. directly on the outer metal conductor of the Danielsson et al. or Sauli GEM structure. A potential difference could not be maintained between these two adjacent metal layers of the hypothetical reconstruction. The skilled artisan would recognize this inability to maintain different potentials, and presumably would resort to a structurally simpler and functionally equivalent metal/insulator/metal three-layer structure.

To summarize, Danielsson et al. teaches a first embodiment with a cascading array where GEM structures are disposed alternately with respect to metal converters and with spaces between GEM structures and the nearest metal converters to assure a potential difference therebetween. Danielsson et al. also discloses a second embodiment with an integrated laminated structure where the metal converter is at an internal position between two adjacent insulator layers. These two embodiments are alleged to function over a broad range of energy levels and hence it is not clear why the

skilled artisan would be motivated to make any change to Danielsson et al. There is certainly no motivation to combine Danielsson et al. with the Sauli low energy detector. Furthermore, Sauli clearly teaches that any cascading array would be provided only for amplification purposes, and hence only the outer most layer in the cascade would have a converter layer. Moreover, Sauli indicates that further converter layers would be functionless and/or disadvantageous due to possible heating by secondary photons. Finally, the metal converter of Danielsson et al. if positioned on the outside of a GEM structure would function at the same potential as the adjacent layer of the GEM structure. The skilled artisan presumably would employ a functionally equivalent and structurally simpler three-layer structure.

In view of the above, it is submitted that the previously amended claims are patentable and allowance is solicited. The Examiner is urged to contact applicants attorney at the number below to expedite the prosecution of this application.

Respectfully submitted,

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